

**FACT SHEET FOR NPDES PERMIT WA0024368**  
**CITY OF VANCOUVER MARINE PARK**  
**WASTEWATER TREATMENT FACILITY**

## TABLE OF CONTENTS

INTRODUCTION .....	1
BACKGROUND INFORMATION .....	2
DESCRIPTION OF THE FACILITY .....	2
History .....	2
Collection System Status .....	2
Treatment Processes .....	2
Discharge Outfall .....	3
Residual Solids .....	3
PERMIT STATUS .....	4
SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT .....	4
WASTEWATER CHARACTERIZATION .....	4
SEPA COMPLIANCE .....	5
PROPOSED PERMIT LIMITATIONS .....	5
DESIGN CRITERIA .....	6
TECHNOLOGY-BASED EFFLUENT LIMITATIONS .....	6
SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS .....	7
Numerical Criteria for the Protection of Aquatic Life .....	8
Numerical Criteria for the Protection of Human Health .....	8
Narrative Criteria .....	8
Antidegradation .....	8
Critical Conditions .....	9
Mixing Zones .....	9
Description of the Receiving Water .....	9
Surface Water Quality Criteria .....	9
Consideration of Surface Water Quality-Based Limits for Numeric Criteria .....	10
Whole Effluent Toxicity .....	13
Human Health .....	14
GROUND WATER QUALITY LIMITATIONS .....	14
COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED IN 1999 .....	14
MONITORING REQUIREMENTS .....	15
EFFLUENT LIMITS BELOW QUANTITATION .....	16
EFFLUENT LIMITS BELOW DETECTION .....	16
LAB ACCREDITATION .....	16
OTHER PERMIT CONDITIONS .....	16
REPORTING AND RECORDKEEPING .....	16
PREVENTION OF FACILITY OVERLOADING .....	16
OPERATION AND MAINTENANCE (O&M) .....	16
RESIDUAL SOLIDS HANDLING .....	17
PRETREATMENT .....	17
WASTEWATER PERMIT REQUIRED .....	17
REQUIREMENTS FOR ROUTINE IDENTIFICATION AND REPORTING OF INDUSTRIAL USERS .....	17
REQUIREMENTS FOR PERFORMING AN INDUSTRIAL USER SURVEY .....	18
DUTY TO ENFORCE DISCHARGE PROHIBITIONS .....	18

*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

SUPPORT BY THE DEPARTMENT FOR DEVELOPING PARTIAL PRETREATMENT PROGRAM BY POTW .....	18
OUTFALL EVALUATION .....	18
GENERAL CONDITIONS .....	19
PERMIT ISSUANCE PROCEDURES .....	19
PERMIT MODIFICATIONS .....	19
RECOMMENDATION FOR PERMIT ISSUANCE .....	19
REFERENCES FOR TEXT AND APPENDICES .....	20
APPENDIX A--PUBLIC INVOLVEMENT INFORMATION .....	21
APPENDIX B--GLOSSARY .....	22
APPENDIX C--TECHNICAL CALCULATIONS .....	27

## INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES) of permits, which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the state of Washington to administer the NPDES permit program. Chapter 90.48 Revised Code of Washington (RCW) defines the Department of Ecology's (Department) authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the state include procedures for issuing permits [Chapter 173-220 Washington Administrative Code (WAC)], technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least 30 days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see [Appendix A--Public Involvement](#) of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

<b><u>GENERAL INFORMATION</u></b>	
Applicant	City of Vancouver
Facility Name and Address	Marine Park Wastewater Treatment Facility* P.O. Box 1995 Vancouver, WA 98665-1995
Type of Treatment	Secondary activated sludge with UV disinfection
Discharge Location	Columbia River Latitude: 45° 36' 36" N                      Longitude: 122° 37' 5" W.
Water Body ID Number	New ID 1220169456238, Old ID WA-CR-1010

\* The Marine Park Wastewater Treatment Facility (Marine Park) has been called the Marine Park Water Reclamation Facility. However, the term "Water Reclamation" has specific meaning under Chapter 90.46 RCW. This facility does not currently reclaim water in accordance with Chapter 90.46 RCW and the State's Water Reuse Standards. Therefore, this facility will be referred to as the Marine Park Wastewater Treatment Facility in this permit.

## **BACKGROUND INFORMATION**

### *DESCRIPTION OF THE FACILITY*

#### **HISTORY**

Marine Park was last upgraded in two phases with the first phase completed and permitted to discharge in December of 1995. The second phase was completed in February 2001 which increased the flow capacity from 8.0 mgd to 16.1 mgd. A third phase expansion could take the facility to a future capacity of 24.2 mgd. This third expansion has not been scheduled at this time. During the last permit cycle, the outfall was modified with the attachment of a multi-port diffuser. A comprehensive outfall dilution and dye study was conducted by CH2MHILL and was issued on April 16, 2004. An overhead map of the current facility, a vicinity map, outfall profile, and schematic can be found in Appendix C.

#### **COLLECTION SYSTEM STATUS**

The City's collection system is a conventional gravity sewer system divided into three sections: the Westside Basin, Eastside Basin, and Diversion Basin with a combined population of approximately 46,000 people in 2003. The Diversion Basin and Eastside Basin are roughly equal in size. All flows from the Eastside basin are treated at the Marine Park Facility. The flows from the Diversion Basin may be divided between the Marine Park facility and Westside Treatment Facility which also serves the City of Vancouver.

The City of Vancouver is growing rapidly and the collection system therefore contains a high percentage of new pipe. The City added 17,016 feet of new pipe to the Marine Park portion of the collection system and 22,267 feet to the Diversion Basin portion in 2003. It is not clear how much of this pipe is replacement of leaking pipe. The amount of Infiltration and Inflow (I/I) is also therefore low in the new lines if constructed properly. In the combined system of the Westside and the Marine Park facilities, the I/I averaged about 11-12 percent of flow. The average influent flow from the collection system served by Marine Park was 11.66 mgd for the maximum month. During a 12-day non-rainfall period in March of 2002, the 7-day average flow was 9.57 mgd. Approximately 2.25 mgd of the flow was comprised of industrial discharge to the treatment facility. With the population equivalent for the combined system at 89,700 persons in 2003, the flow per capita is therefore  $7.32 \text{ mgd}/89,700 = 81.6 \text{ gal/capita day}$ . I/I is usually a problem when flow is above 120 gal/capita day if the flow occurs during a 7-14 day non-rainfall period when there is high ground water. The I/I program will need to continue as the system ages. The Permittee will need to keep monitoring the I/I to ensure that it does not increase significantly from year to year. An annual I/I report will be required in the new permit.

The City has continued to implement I/I elimination projects with new sewer pipe and abandoning old sewer mains as well as rehabilitating manholes within the sewer drainage system.

#### **TREATMENT PROCESSES**

Raw sewage flow enters the plant and is pumped up to a height so as to gravity flow through the rest of the plant. The sewage passes three parallel mechanical screens before passing through one to three Parshall flumes. The number of flumes and other treatment basins in use depends on the flow entering the plant. The flow passes through one of six aerated grit chambers and then one of six primary clarifiers. The flow passes through one of six aeration basins before heading on to one of the four secondary clarifiers. The clarified effluent is disinfected with UV light before being discharged to the Columbia River. All of the processes and basins, including the clarifiers, are under cover. The facility buildings

*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

were architecturally designed so as to blend with the other office buildings in the area. You would not know there is a sewage treatment plant there when passing by the road or water.

There are several industrial users that discharge to the Marine Park facility. The following facilities were shown in the application received in July 2003:

<b>Facility Name</b>	<b>Continuous Flow</b>	<b>Intermittant Flow</b>
Atomic Powder Coat	82 gpd	120 gpd
U.S. Filter Ion Pure Inc.	711 gpd	32,400 gpd
Micropump	1300 gpd	650 gpd
SEH (silicon wafers)	2,044,800 gpd process water 118,000 gpd non-process	
Encompass Materials (Silicon wafers)	41,500 gpd process water 450 gpd non-process	
Frontier Hardchrome (plating)	40,000 gpd	
totals	2.25 mgd	0.033 mgd

All of these facilities have local limits and all except for U.S Filter have categorical standards described in federal statute.

The Marine Park facility is classified as a Class IV plant under WAC 173-230-140. An operator certified for at least a Class IV plant must be in charge of the day-to-day operation the plant. An operator certified for at least a Class III plant shall be in charge during all regularly scheduled shifts. The Marine Park is operated under contract by Veolia Water, North America. There are three certified operators: one has a group IV certification, one has a group III certification and one has a group I certification.

#### DISCHARGE OUTFALL

The secondary treated and disinfected effluent discharges to the Columbia River via an outfall that is approximately 750 from the north shore. The outfall was extended with a new multi-port diffuser in 2000 as part of the Phase 2 expansion. The diffuser is 152-feet long and has 20 7.5-inch diameter ports spaced 8 feet on centers and oriented 45° to the direction of the river flow. The ports are on risers that allow the heights to be adjusted to keep the ports a minimum of 2-feet above the bottom of the river bed. The outfall and diffuser was inspected in August of 2003. The ports were 4 to 6 feet above the river bottom at that time. The outfall and diffuser were found to be in excellent condition.

A dye study was conducted and used to calibrate a computer dilution model (CH2MHILL, 2004). This model was used to predict dilution at a minimum and maximum flow. The minimum seven-day flow expected every ten years (7Q10 minimum) which was 79,436 cfs. The high flow was modeled on a 7Q10 maximum which was 379,771 cfs. The dye study was conducted at a flow of 164,648 cfs. The dilution study predicted a minimum acute dilution of 16:1 and a minimum chronic dilution of 99:1.

#### RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit removed from the aerated grit chambers is used as a soil amendment by South Sound Soils of Thurston County. The rags and screenings are drained and disposed of as solid waste at the Clark County solid waste transfer station. Scum and solids removed from the primary and secondary clarifiers are pumped to Westside treatment

*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

plant via a force main and then a gravity sewer main. Solids removed from both plants are then incinerated in a fluidized bed furnace at the Vancouver Westside facility. Solids that are counted and shipped from the Marine Park facility must not be re-counted at the Westside facility and used in the calculation of percent removal.

*PERMIT STATUS*

The previous permit for this facility was issued on January 14, 1999. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and ammonia.

An application for permit renewal was submitted to the Department on July 10, 2003, and accepted by the Department on May 5, 2004.

*SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT*

The facility received its last inspection on February 4, 2004. The purpose of that inspection was to gather information about the facility for the purpose of writing this permit and fact sheet.

During the history of the previous permit, the Permittee has remained in compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

*WASTEWATER CHARACTERIZATION*

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows:

Table 1: Wastewater Characterization. The plant was upgraded in February 2001. Data was examined for the three year period March 2001 – February 2004.

<u>Parameter</u>	<u>Concentration</u>
Flow	9.61 mgd (avg.) 11.26 mgd (95 <sup>th</sup> percentile) 16.39 mgd (max.)
BOD <sub>5</sub>	18.2 mg/L (95 <sup>th</sup> percentile) 1433 lbs/day (95 <sup>th</sup> percentile) 89% removal (minimum)
TSS	17.5 mg/L (95 <sup>th</sup> percentile) 1293 lbs/day (95 <sup>th</sup> percentile) 93% removal (minimum)
pH	6.2 S.U. (min.), 6.2 (5 <sup>th</sup> percentile) 7.7 S.U. (max.), 7.5 (95 <sup>th</sup> percentile)
Ammonia	25 mg/L (95 <sup>th</sup> percentile), 6.9 mg/L (avg.)
Fecal Coliform	4.5 org./100 mL (Avg.) 320 org./100 mL (max.)

The Marine Park facility was upgraded and completed in February 2001 to 16.1 mgd. The characterization of the facility shown in Table 1 is for the three year period since the upgrade.

The flow has been reasonable with the flow below 11.26 mgd 95 percent of the time. Both BOD and TSS have been held well within permit limits and the removal rates have been favorable. The average fecal coliform was low at 4.5 org/100 ml. Although the maximum shows 320 org/100 ml, the weekly geomean never exceeded 50 org/100 ml. The pH minimum and maximums show that it has continually been held

within limits. The ammonia however, shows a potential problems. The old permit had ammonia limits in phase 1 of 4.8 mg/l average monthly and 12.0 mg/L average weekly, but ammonia limits were not in phase 2 after the upgrade. The table above shows that ammonia averaged 6.9 mg/L and had a 95<sup>th</sup> percentile of 25 mg/L. The 95<sup>th</sup> percentile of effluent parameters are used in determining whether there is a reasonable potential for a parameter to violate water quality standards and whether a permit limit is needed. More will be discussed about ammonia later in the toxics section.

A comprehensive list of metals, volatile organic pollutants, and semi-volatile organics were sampled from 2000 through 2001 (CH2MHILL, 2004). None of the organic toxins were detected with the exception of acetone and fluoride which did not appear to be a problem. Of the metals and organic compounds, the following were examined in the reasonable potential analysis.

Metals and Organics were sampled between one to 11 times, sometimes with widely varying detection levels. The values shown below in table 2 represent the highest detected values for the major toxic metals and organic substances. Out of 121 organic toxic pollutants, only one (acetone) registered above the detection level.

Table 2: Effluent Metals and Organic toxins sampled in 2002-2003 (Highest value)

<u>Parameter (metals total rec.)</u>	<u>Concentration</u>	<u>Number of Samples</u>
Acetone	42.5 µg/L	1
Arsenic	1.67 µg/L	7
Cadmium	All below detection	7
Chromium	13	7
Copper	19.4	8
Lead	1.0 (All below detection)	7
Mercury	0.006 (Clean technique)	4
Silver	1.3	7
Zinc	85	11

#### *SEPA COMPLIANCE*

At the present time there are no actions that require State Environmental Policy Act (SEPA) compliance. The General Sewer Plans require SEPA compliance and notification. The last facility plan was issued for the phase 2 expansion in September 1998.

#### **PROPOSED PERMIT LIMITATIONS**

Federal and state regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the state of Washington were determined and included in



*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

this permit. The Department does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

*DESIGN CRITERIA*

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from the 1998 Facility Plan Amendment (CH2MHILL, 1998) and are as follows:

**Table 2: Existing Design Standards for Vancouver Marine Park WWTP.**

Parameter	Design Quantity
Monthly average flow (max. month)	16.1 mgd
Monthly average dry weather flow	13.8 mgd
Instantaneous peak flow (max. hour)	41.8 mgd
BOD <sub>5</sub> influent loading (max. month)	26,240 lb./day
TSS influent loading (max. month)	30,620 lb./day
Design population equivalent (RE's)	Not located in Engineering Report*
*RE's at 250 gpd/RU & max avg yr flow = 57,600	

**Table 2A: Future Design Standards at Final Buildout  
(Not expected or authorized under this permit cycle)**

Parameter	Future Design Quantity
Monthly average flow (max. month)	24.2 mgd
Monthly average dry weather flow	20.7 mgd
Instantaneous peak flow (max. hour)	62.8 mgd
BOD <sub>5</sub> influent loading (max. month)	38,990 lb./day
TSS influent loading (max. month)	45,510 lb./day
Design population equivalent (RE's)	Not located in Engineering Report*
*RE's at 250 gpd/RU & max avg yr flow = 86,400	

*TECHNOLOGY-BASED EFFLUENT LIMITATIONS*

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state).

*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD<sub>5</sub>, and TSS are taken from Chapter 173-221 WAC are:

**Table 3: Technology-based Limits.**

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD <sub>5</sub> (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

The policy for establishing the mass-based limits is to use the more stringent of the two methods used below for monthly mass loadings for technology-based limits. Because the TSS and BOD influent loading are different (26,240 lbs/day for BOD and 30,620 lb./day for TSS), the two parameters each have the lowest limits with different methods. TSS was more stringent with the first method shown which includes the design flow in the calculation. BOD was more stringent with the second method which used the design loading in the calculation.

Monthly effluent mass loadings of TSS (lbs/day) were calculated as the maximum monthly design flow (16.1 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 4,028 lbs/day.

The weekly average effluent mass loading of TSS is calculated as 1.5 x monthly loading = 6,042 lbs/day.

Monthly effluent mass loadings of BOD<sub>5</sub> (lbs/day) were calculated as the maximum monthly influent design loading (26,240 lbs/day) x 0.15 = 3,936 lbs/day.

The weekly average effluent mass loading of BOD is calculated as 1.5 x monthly loading = 5,904 lbs/day

***SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS***

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual

waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

#### NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the state of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

#### NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

#### NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

#### ANTIDegradation

The state of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

The natural condition of the water cannot be easily discerned from the conditions in the ambient environment as they exist today.

There are several parameters listed on the 303(d) list of limited water bodies in this segment of the Columbia River. The 1998 303(d) listing of WRIA 28 has listings for Arsenic, fecal coliform, sediment bioassay, temperature, and total dissolved gas.

A temperature TMDL is in progress for the Snake and Columbia Rivers. Diminishing riparian vegetation, increased thermal absorption due to dams (with shallower backwaters), return flows from irrigation, and increased numbers of thermal discharges have all had significant effects on the Columbia River temperature as a whole. This is measurable in all areas of the river including the area of the Marine Park outfall. More will be discussed under Considerations for Surface Waters below.

*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

The total dissolved gas is almost entirely a product of excess water spilled at the upstream hydropower facilities and is not a product of wastewater facilities.

The sediment bioassay does not appear to be related to the discharge from the municipal sewage treatment plant.

The Arsenic was listed in the 1998 303(d) list but has since been retested and meets standards.

Fecal Coliform showed up on the 1998 303(d) list but did not show up on subsequent testing and will not be on the 2002 list or the proposed 2004 list. The Marine Park facility is equipped with UV disinfection which can easily meet the technology and water quality limits.

#### CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

#### MIXING ZONES

The Water Quality Standards allow the Department to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

#### DESCRIPTION OF THE RECEIVING WATER

The facility discharges to the Columbia River which is designated as a Class A receiving water in the vicinity of the outfall. There are no other outfalls within a mile of the Marine Park outfall. The Westside Vancouver treatment plant is more than a mile downstream and the City of Camas is more than a mile upstream as are other industrial outfalls. Significant nearby non-point sources of pollutants includes stormwater. The area of the outfall is very urbanized with a high percentage of impervious surfaces.

Characteristic uses of Class A water include the following: water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

#### SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	100 organisms/100 mL maximum geometric mean and not have more than 10 percent of all samples obtained for
-----------------	---

*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

	calculating the geometric mean value exceeding 200 organisms/100 mL.
Dissolved Oxygen	Shall exceed 90% of saturation
Temperature	20 degrees Celsius maximum or no temperature increases will be allowed which will raise the receiving water by greater than 0.3° C above background or 1.1° C due to all such activities combined.
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC. The Permittee consulted with CH2MHILL to conduct a dye study and calibrate a dilution model. The dilution modeling was completed in April 2004. The UDKHDEN model was selected and the configuration of the new outfall diffuser were used. The results of this modeling are shown below.

	Acute	Chronic
Aquatic Life	16:1	99:1
Human Health, Carcinogen		99:1
Human Health, Non-carcinogen		99:1

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical summer condition for the Columbia River is the seven day average low river flow with a recurrence interval of ten years (7Q10). However, there are winter conditions where the pH is higher than in the summer and was examined to see if there were ammonia toxicity problems that could be worse in the winter than in the summer. Ambient data at critical conditions in the vicinity of the Marine Park outfall was taken from the TMDL study which considered both historical data and an intensive monitoring study conducted in September-October 1990. The ambient background data used for this permit includes the following:

The flow, depth, and velocity were from CH2MHILL 2004 report. The ambient temperature was based on 453 daily maximums during the summer months of June through September (2000-2003) from the USGS dissolved gas monitoring network station at Washougal. The pH was from a combination of

*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

USGS 1994 data from Warrendale and the Department 2002 data from a monitor station near Vancouver (28A100). All other ambient monitoring data was from the Department 2002 data from the same monitor station near Vancouver.

**Table 4: Ambient Conditions**

Season	Flow	Discharge Depth	Current Velocity	Temperature 90 <sup>th</sup> percentile
Summer Low Flow 7Q10	79,436 cfs	7.0 ft	0.6 ft/sec	21.48° C
Winter High flow 7Q10	379,771 cfs	19.3 ft	5.7 ft/sec	

Parameter	Value used
pH	8.46 winter (90 <sup>th</sup> percentile of 15 combined samples) 7.99 summer (90 <sup>th</sup> percentile of 8 combined samples)
Dissolved Oxygen	8.9 mg/L 90 <sup>th</sup> percentile (90% of saturation is 7.92 mg/L)
Total Ammonia-N	0.027 mg/L summer (geom * 1.74) 0.019 mg/L winter (geom * 1.74)
Fecal Coliform	28 org/100 ml summer (geom * 1.74) 7 org/100 ml winter (geom*1.74)
Conductivity	119 µmhos/cm
Turbidity	5.4 NTU

Metals and toxics in ambient environment (Because most of these values had less than 20 samples, a geometric mean times 1.74 was used to approximate a 90<sup>th</sup> percentile.).

Hardness	48.75 mg/L as CaCO <sub>3</sub> 10 <sup>th</sup> percentile
Arsenic	1.74 µg/L dissolved
Cadmium	0.06 µg/L dissolved
Chromium	0.514 µg/L dissolved
Copper	1.294 µg/L dissolved
Nickel	0.842 µg/L dissolved
Mercury	All samples below detection at 0.002-0.004 µg/L
Lead	0.0628 µg/L dissolved
Silver	1.736 µg/L dissolved
Zinc	2.553 µg/L dissolved
All Other Metals	0.0 (below detection limits)

BOD<sub>5</sub>--Under critical summer conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitation for BOD<sub>5</sub> was placed in the permit.

The impact of BOD on the receiving water was modeled using the Streeter-Phelps analysis of dissolved oxygen sag at critical condition and with the technology-based effluent limitation for BOD<sub>5</sub> described under "Technology-Based Effluent Limitations" above. A calculation with no BOD<sub>5</sub> inputs showed no difference in far-field dissolved oxygen from a calculation using the maximum allowed BOD<sub>5</sub> of 30 mg/L.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by simple mixing analysis at critical condition. The receiving water temperature at the critical condition is 21.48°C and the effluent temperature is 23.3°C. The predicted resultant temperature at the boundary of the chronic mixing zone is 21.498°C and the incremental rise is 0.018°C. The ambient temperature represents the 90<sup>th</sup> percentile of 453 daily maximums from June-September of 2001-2003 at the USGS monitoring station at Warrendale. The effluent temperature represents the 95<sup>th</sup> percentile of 460 daily maximums from June-September of 2001-2003.

Because the increase is small compared to the 0.3°C normally allowed under the standards, because a TMDL is in progress which will allot loading to different sources, and because all of the clarifiers are already covered which prevents direct solar heating, the Permittee will not be required to limit temperature at this time. However, the Permittee will be required to continue to monitor effluent temperature for daily maximum. The Marine Park facility is not a significant source of thermal pollution. Nonetheless, temperatures in the lower Columbia consistently exceeded the standard in July and August. The USGS study found the Willamette River was the warmest tributary to the Columbia (up to 24.2°C).

A preliminary draft temperature TMDL was proposed for the Snake and Columbia Rivers, but has not been completed or continued at this time. Diminishing riparian vegetation, increased thermal absorption due to dams (with shallower backwaters), return flows from irrigation, and increased numbers of thermal discharges have all had significant effects on the Columbia River temperature as a whole. This is measurable in all areas of the river including the area of the Marine Park outfall. According to the USGS data, the long term trend in the Columbia River temperature has been increasing at 0.073°C per year, and in the Willamette it has been increasing 0.14°C per year. It is possible under the final temperature TMDL that the Marine Park facility will be required to cool its effluent to meet the water quality criteria during the critical season.

pH--The impact of pH with temperature were modeled using the calculations from EPA, 1988. Summer and winter conditions were modeled separately. The summer input variables were dilution factor of 99:1, upstream temperature 21.48°C, upstream pH 7.7, upstream alkalinity 53 (as mg CaCO<sub>3</sub>/L), effluent temperature 23.3°C, effluent pH of 6, effluent pH of 9, and effluent alkalinity 150 (as mg CaCO<sub>3</sub>/L) assumed. The winter input variables were dilution factor 99, upstream temperature 15.13°C, upstream pH 8.46, upstream alkalinity 53(as mg CaCO<sub>3</sub>/L), effluent temperature 22°C, effluent pH of 6, effluent pH of 9, and effluent alkalinity 150(as mg CaCO<sub>3</sub>/L) assumed. The ambient pH is high in the winter, however, no violation of the standards were predicted. The calculation table can be found in Appendix C.

Therefore, the technology-based effluent limitations for pH were placed in the permit and temperature was not limited.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 99. The background fecal coliform was around 28 org./100 ml (because there were less than 20 data points, a geometric mean times 1.74 was used to approximate a 90<sup>th</sup> percentile). Under this analysis the fecal coliform did not exceed 31 org/100 ml which is much less than the 100 org/100 ml of the Class A criterion.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: ammonia, and heavy metals. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for arsenic, ammonia, cadmium, chromium, copper, lead, mercury, silver, and zinc to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The critical condition in this case occurs during the summer months for most of the toxics. Ammonia also included a reasonable potential analysis during winter conditions. The parameters used in the critical condition modeling are as follows: acute dilution factor 16:1, chronic dilution factor 99:1. All the background conditions are shown in the ambient conditions table above.

Valid ambient background data was available for the pollutants listed. Calculations using all applicable data resulted in a determination that there is no reasonable potential for this discharge to cause a violation of water quality standards. This determination assumes that the Permittee meets the other effluent limits of this permit.

#### WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sub lethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC<sub>50</sub>, EC<sub>50</sub>, IC<sub>25</sub>, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Department Publications Distribution Center 360-407-



*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

7472 for a copy. The Department recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

An effluent characterization for acute and chronic toxicity was conducted during the previous permit term. In accordance with WAC 173-205-060, the Permittee must repeat this effluent characterization for the following reason:

The Permittee has made changes to processes, materials, or treatment that could result in an increase in effluent toxicity; the facility receives wastewater from several industrial discharges; and the facility has shown an increase in ammonia values that have been routinely higher than the period when the WET testing last took place (effluent ammonia had a 95<sup>th</sup> percentile of 25 mg/L as shown in table 1 above). In accordance with WAC 173-205-060(1), the proposed permit requires another effluent characterization for toxicity.

The average dry weather flow volume has changed by ten percent or more due to changes in plant processes, production changes, or increases in the number of users. In accordance with WAC 173-205-060(1), the proposed permit requires another effluent characterization for toxicity.

#### **HUMAN HEALTH**

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge does not contain chemicals of concern based on existing data. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

#### **GROUND WATER QUALITY LIMITATIONS**

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

#### **COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED IN 1999**

The 1999 permit had limits for Phase 1 and Phase 2 construction. The existing limits shown below are for the Phase 2 construction. The footnotes are not included here.

Parameter	Existing Limits	Proposed Limits
Biochemical Oxygen	30 mg/L and 4,028 lbs/day	30 mg/L and 3,936 lbs/day

*FACT SHEET FOR NPDES PERMIT WA0024368  
CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

Demand (5 day)	Monthly, 45 mg/L and 6,042 lbs/day Weekly 85% removal	Monthly, 45 mg/L and 5,904 lbs/day Weekly 85% removal
Total Suspended Solids	30 mg/L and 4,028 lbs/day Monthly, 45 mg/L and 6,042 lbs/day Weekly 85% removal	30 mg/L and 4,028 lbs/day Monthly, 45 mg/L and 6,042 lbs/day Weekly 85% removal
Fecal Coliform Bacteria	200 org/100 ml 400 org/100 ml	200 org/100 ml 400 org/100 ml
pH	Daily minimum is equal to or greater then 6 and the daily maximum is less than or equal to 9.	Daily minimum is equal to or greater then 6 and the daily maximum is less than or equal to 9.

Note that the BOD load limits are different under the new permit than under the 1999 permit. This is because the 1999 permit used an incorrect method for calculating the BOD loading.

### **MONITORING REQUIREMENTS**

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring for ammonia and temperature will need to continue so as to further characterize the effluent. A priority pollutant scan will need to be repeated as required under the pretreatment portion of the permit. The priority pollutants will include metals, phenols, cyanide and all other toxic pollutants. These pollutants which are typical of the industrial discharges received by Marine Park could have a significant impact on the quality of the surface water.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2 and under pretreatment in S.6. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of the Department's *Permit Writer's Manual* (July 1994) for an activated sludge treatment facility with more than 5.0 mgd average design flow.

As a pretreatment Publicly Owned Treatment Works (POTW), the City is required to have influent, primary clarifier effluent, final effluent, and sludge sampled for toxic pollutants in order to characterize the industrial input and periodically recalculate local limits. Sampling is also done to determine if pollutants interfere with the treatment process or pass through the plant to the sludge or the receiving water. The monitoring data will be used by the City to confirm the effectiveness, and periodically revise local limits which commercial and industrial users must meet.

*EFFLUENT LIMITS BELOW QUANTITATION*

The water quality-based effluent limits for some metals in the wastewater may be below the capability of current analytical technology to quantify. The Quantitation Level is the level at which concentrations can be reliably reported with a specified level of error. For maximum daily effluent limits, if the measured effluent concentration is below the Quantitation Level, the Permittee reports NQ for non-quantifiable. For average monthly effluent limits, all effluent concentrations below the Quantitation Level but above the Method Detection Level are used as reported for calculating the average monthly value.

*EFFLUENT LIMITS BELOW DETECTION*

The water quality-based effluent limits for some metals and toxics in the wastewater may also be below the capability of current analytical technology to detect. The Method Detection Level (MDL) is the minimum concentration of an analyte that can be measured and reported with a 99 percent confidence that its concentration is greater than zero as determined by a specific laboratory method. For maximum daily limits, if the concentrations are below the MDL the Permittee reports ND for non-detectable. For average monthly limits, all values above the MDL are used as reported and all values below the MDL are calculated as zero.

*LAB ACCREDITATION*

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for Ammonia, BOD, COD, Dissolved Oxygen, Orthophosphate, pH, TSS, and Fecal Coliform Bacteria. The accreditation is due to expire May 9, 2005.

**OTHER PERMIT CONDITIONS**

*REPORTING AND RECORDKEEPING*

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

*PREVENTION OF FACILITY OVERLOADING*

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

*OPERATION AND MAINTENANCE (O&M)*

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

### *RESIDUAL SOLIDS HANDLING*

To prevent water quality problems the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by the Department under Chapter 70.95J RCW and Chapter 173-308 WAC. The disposal of other solid waste is under the jurisdiction of the Clark County Health Department.

Requirements for monitoring sewage sludge and recordkeeping are included in this permit. This information will be used by the Department to develop or update local limits and is also required under 40 CFR 503.

### *PRETREATMENT*

To provide more direct and effective control of pollutants discharged, the City of Vancouver has been delegated permitting, monitoring and enforcement authority for industrial users discharging to their treatment system. The Department oversees the delegated Industrial Pretreatment Program to assure compliance with federal pretreatment regulations (40 CFR Part 403) and categorical standards and state regulations (Chapter 90.48 RCW and Chapter 173-216 WAC).

An industrial user survey is required to determine the extent of compliance of all industrial users of the sanitary sewer and wastewater treatment facility with federal pretreatment regulations (40 CFR Part 403 and Sections 307(b) and 308 of the Clean Water Act), with state regulations (Chapter 90.48 RCW and Chapter 173-216 WAC), and with local ordinances.

As sufficient data becomes available, the Permittee shall, in consultation with the Department, reevaluate its local limits in order to prevent pass through or interference. Upon determination by the Department that any pollutant present causes pass through or interference, or exceeds established sludge standards, the Permittee shall establish new local limits or revise existing local limits as required by 40 CFR 403.5. In addition, the Department may require revision or establishment of local limits for any pollutant that causes an exceedance of the Water Quality Standards or established effluent limits, or that causes whole effluent toxicity. The determination by the Department shall be in the form of an Administrative Order. In order to develop these local limits, the Department will provide environmental criteria or limits for the various pollutants of concern.

The Department may modify this permit to incorporate additional requirements relating to the establishment and enforcement of local limits for pollutants of concern. Any permit modification is subject to formal due process procedures pursuant to state and federal law and regulation.

### *Wastewater Permit Required*

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

### *Requirements for Routine Identification and Reporting of Industrial Users*

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system." Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization

records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a state waste discharge permit application.

#### *Requirements for Performing an Industrial User Survey*

This POTW has the potential to serve significant industrial or commercial users and is required to perform an Industrial User Survey. The goal of this survey is to develop a list of SIUs and PSIUs, and of equal importance, to provide sufficient information about industries which discharge to the POTW, to determine which of them require issuance of state waste discharge permits or other regulatory controls. An Industrial User Survey is an important part of the regulatory process used to prevent interference with treatment processes at the POTW and to prevent the exceedance of water quality standards. The Industrial User Survey also can be used to contribute to the maintenance of sludge quality, so that sludge can be a useful biosolids product rather than an expensive waste problem. An Industrial User Survey is a rigorous method for identifying existing, new, and proposed significant industrial users and potential significant industrial users. A complete listing of methodologies is available in the Department guidance document entitled "Conducting an Industrial User Survey."

#### *Duty to Enforce Discharge Prohibitions*

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

#### *Support by the Department for Developing Partial Pretreatment Program by POTW*

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

#### *OUTFALL EVALUATION*

Because the outfall has had recent failure and because the outfall is located in shallow water, an outfall inspection will be required. Proposed permit Condition S.10 requires the Permittee to conduct an outfall inspection once every two years and submit reports detailing the findings of the inspections. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

*GENERAL CONDITIONS*

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

**PERMIT ISSUANCE PROCEDURES**

*PERMIT MODIFICATIONS*

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

*RECOMMENDATION FOR PERMIT ISSUANCE*

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for five years.

## REFERENCES FOR TEXT AND APPENDICES

### CH2MHILL

2004 April 16. Outfall Dilution Study Report. Marine Park Water Reclamation Facility. City of Vancouver.

### Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

### Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

### Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

### Washington State Department of Ecology.

Laws and Regulations( <http://www.ecy.wa.gov/laws-rules/index.html> )

Permit and Wastewater Related Information

(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

### Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

### Water Pollution Control Federation.

1976. Chlorination of Wastewater.

### Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

## APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to issue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on August 10, 2003, and August 17, 2003, in the *Columbian* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on \_\_\_\_\_, in the *Columbian* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Carey Cholski  
Water Quality Permit Administrator  
Department of Ecology  
Southwest Regional Office  
P.O. Box 47775  
Olympia, WA 98504-7774.

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (360) 407-6554, or by writing to the address listed above.

This permit and fact sheet were written by Eric Schlorff.



## **APPENDIX B--GLOSSARY**

**Acute Toxicity**--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

**AKART**-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

**Ambient Water Quality**--The existing environmental condition of the water in a receiving water body.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation** --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

**Average Weekly Discharge Limitation** -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Best Management Practices (BMPs)**--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of a treatment facility.

**CBOD<sub>5</sub>** – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celcius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD<sub>5</sub> is given in 40 CFR Part 136.

**Chlorine**--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Combined Sewer Overflow (CSO)**--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

**Construction Activity**--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

**Continuous Monitoring** --Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report**--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample**--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

**Industrial User**-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Infiltration and Inflow (I/I)**--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

**Interference** -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Major Facility**--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone**--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

**Pass through** -- A discharge which exits the POTW into waters of the--State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Potential Significant Industrial User**--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation Level (QL)**-- A calculated value five times the MDL (method detection level).

**Significant Industrial User (SIU)**--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority\* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority\* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

\*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Upset**--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

## APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

Calculation of pH of a mixture of two flows. Based on the  
procedure in EPA's DESCON program (EPA, 1988. Technical  
Guidance on Supplementary Stream Design Conditions for Steady  
State Modeling. USEPA Office of Water, Washington D.C.)  
Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

### Summer Condition

INPUT	
	Summer
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	99.000
1. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	21.48
pH:	7.99
Alkalinity (mg CaCO3/L):	53.00
2. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	23.30
pH:	9.00
Alkalinity (mg CaCO3/L):	150.00
OUTPUT	
1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.37
Effluent pKa:	6.36
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.98
Effluent Ionization Fraction:	1.00
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	54.28
Effluent Total Inorganic Carbon (mg CaCO3/L):	150.34

*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

4. CONDITIONS AT MIXING ZONE BOUNDARY

Temperature (deg C):	21.50
Alkalinity (mg CaCO <sub>3</sub> /L):	53.98
Total Inorganic Carbon (mg CaCO <sub>3</sub> /L):	55.25
pKa:	6.37
pH at Mixing Zone Boundary:	8.00

Calculation of pH of a mixture of two flows. Based on the  
 procedure in EPA's DESCON program (EPA, 1988. Technical  
 Guidance on Supplementary Stream Design Conditions for Steady  
 State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

Winter Condition

INPUT	
	Winter
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	99.000
1. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	15.30
pH:	8.46
Alkalinity (mg CaCO <sub>3</sub> /L):	53.00
2. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	22.00
pH:	9.00
Alkalinity (mg CaCO <sub>3</sub> /L):	150.00
OUTPUT	

1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.42
Effluent pKa:	6.37
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.99
Effluent Ionization Fraction:	1.00

*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

3. TOTAL INORGANIC CARBON

Upstream/Background Total Inorganic Carbon (mg CaCO <sub>3</sub> /L):	53.48
Effluent Total Inorganic Carbon (mg CaCO <sub>3</sub> /L):	150.35

4. CONDITIONS AT MIXING ZONE BOUNDARY

Temperature (deg C):	15.37
Alkalinity (mg CaCO <sub>3</sub> /L):	53.98
Total Inorganic Carbon (mg CaCO <sub>3</sub> /L):	54.46
pKa:	6.42
pH at Mixing Zone Boundary:	8.47

Ammonia Criteria Calculation (Summer Condition)

Calculation Of Ammonia Concentration and Criteria for fresh water. Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992.

INPUT

1. Ambient Temperature (deg C; 0<T<30)	21.5
2. Ambient pH (6.5<pH<9.0)	7.99
3. Acute TCAP (Salmonids present- 20; absent- 25)	20
4. Chronic TCAP (Salmonids present- 15; absent- 20)	15

OUTPUT

1. Intermediate Calculations:	
Acute FT	1.00
Chronic FT	1.41
FPH	1.01
RATIO	14
pKa	9.35
Fraction Of Total Ammonia Present As Un-ionized	4.1258%
2. Un-ionized Ammonia Criteria	
Acute (1-hour) Un-ionized Ammonia Criterion (ug NH <sub>3</sub> /L)	258.3
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH <sub>3</sub> /L)	41.7
3. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (mg NH <sub>3</sub> + NH <sub>4</sub> /L)	6.3
Chronic Total Ammonia Criterion (mg NH <sub>3</sub> + NH <sub>4</sub> /L)	1.0
4. Total Ammonia Criteria expressed as Nitrogen:	
Acute Ammonia Criterion as mg N	5.1



*FACT SHEET FOR NPDES PERMIT WA0024368*  
*CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY*

Chronic Ammonia Criterion as N 0.83

Ammonia Criteria Calculation (Winter Condition)

Calculation Of Ammonia Concentration and Criteria for fresh water. Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992.

INPUT

1. Ambient Temperature (deg C; 0<T<30)	15.1
2. Ambient pH (6.5<pH<9.0)	8.46
3. Acute TCAP (Salmonids present- 20; absent- 25)	20
4. Chronic TCAP (Salmonids present- 15; absent- 20)	15

---

OUTPUT

1. Intermediate Calculations:	
Acute FT	1.40
Chronic FT	1.41
FPH	1.00
RATIO	14
pKa	9.56
Fraction Of Total Ammonia Present As Un-ionized	7.3867%
2. Un-ionized Ammonia Criteria	
Acute (1-hour) Un-ionized Ammonia Criterion (ug NH3/L)	185.7
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH3/L)	42.0
3. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (mg NH3+ NH4/L)	2.5
Chronic Total Ammonia Criterion (mg NH3+ NH4/L)	0.6
4. Total Ammonia Criteria expressed as Nitrogen:	
Acute Ammonia Criterion as mg N	2.1
Chronic Ammonia Criterion as N	0.47

FACT SHEET FOR NPDES PERMIT WA0024368  
CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY

### Reasonable Potential Spreadsheet

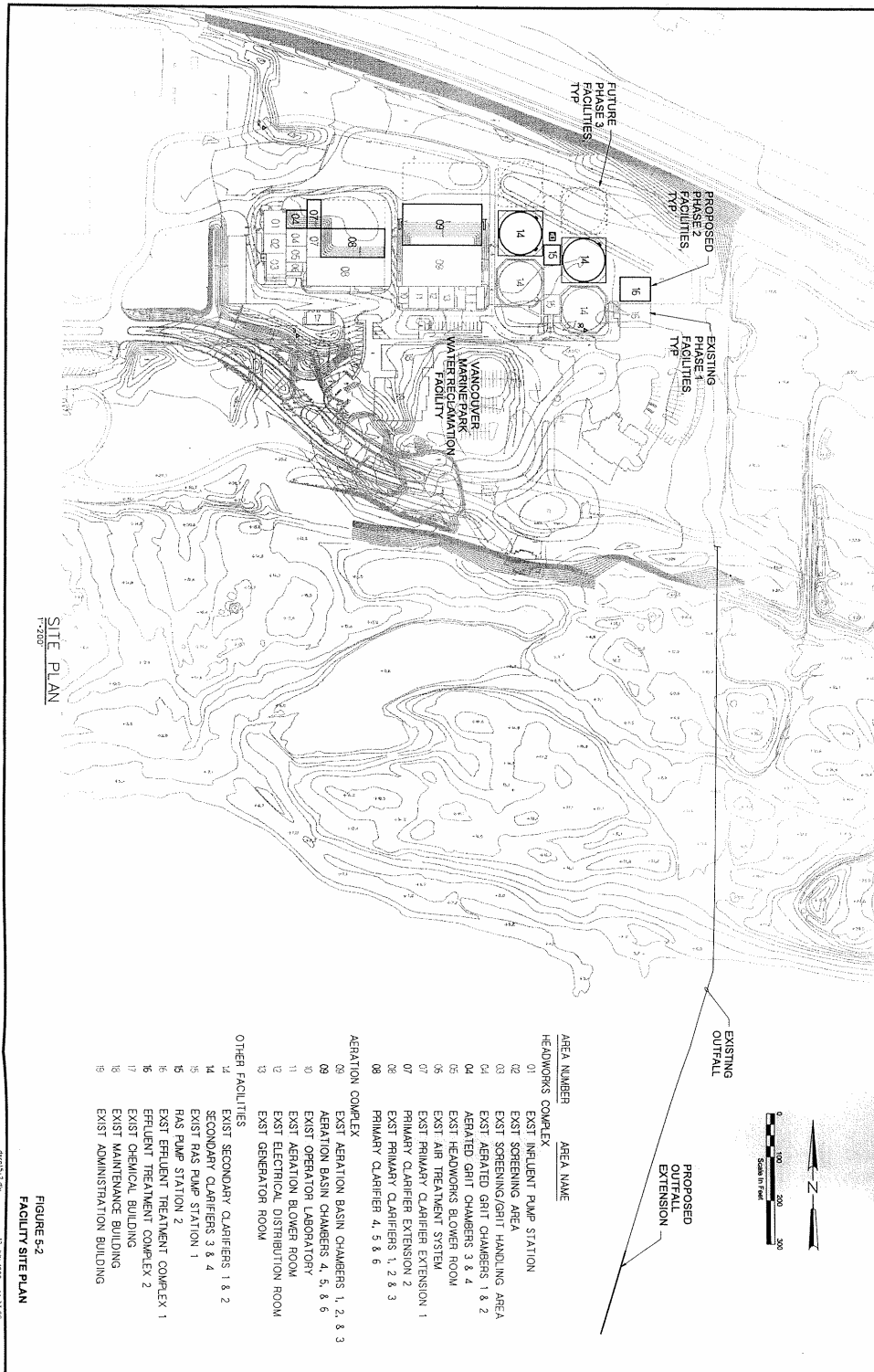
This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings.

Corrected formulas in col G and H on 5/98 (GB)

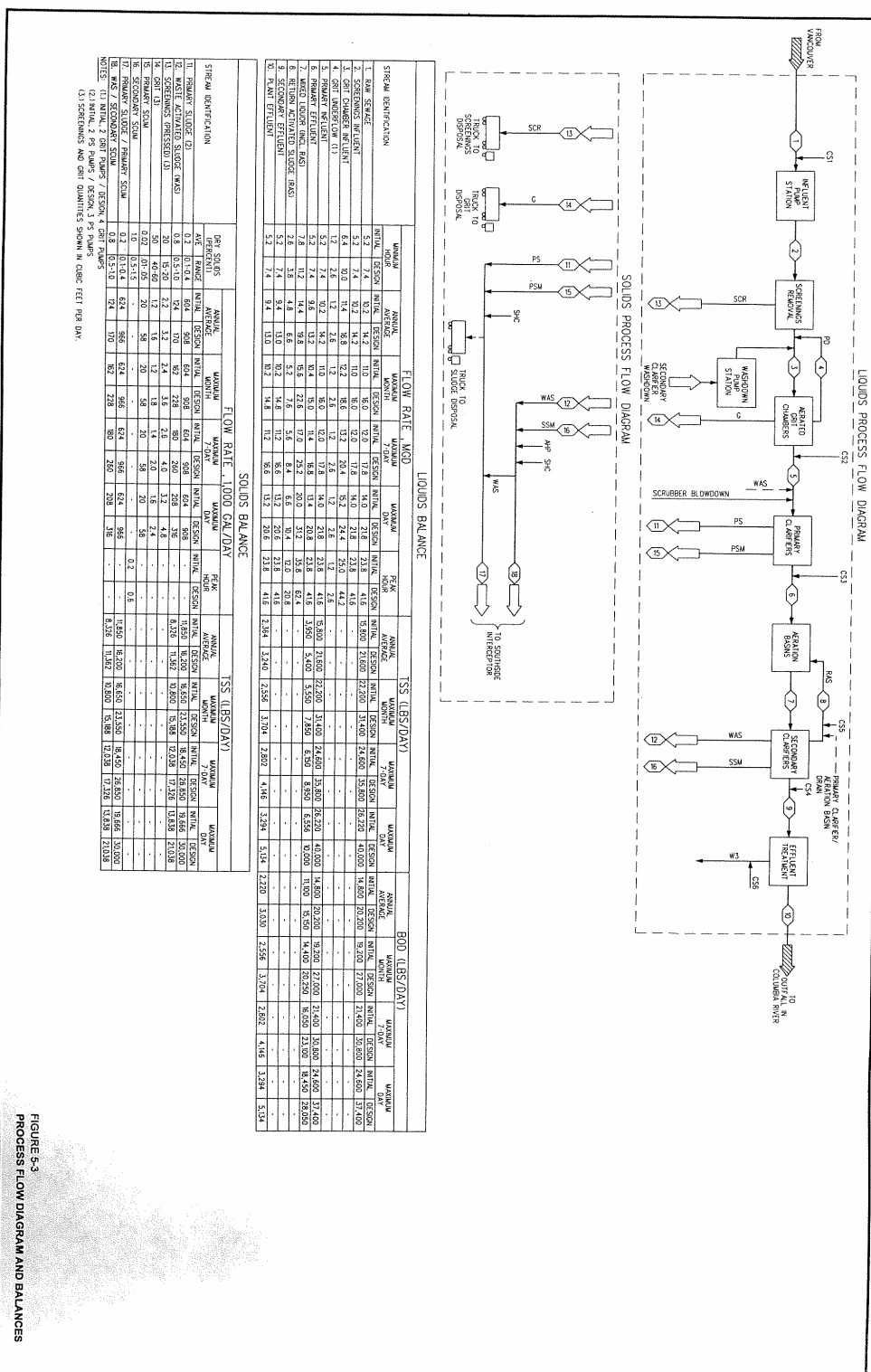
### CALCULATIONS

Parameter	State Water Quality Standard			Max concentration at edge of...		LIMIT REQ'D ?	CALCULATIONS									
	Metal Criteria Translat or as decimal	Metal Criteria Translat or as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	Effluent percentile value	Pn	Max effluent conc. measured (metals as total recoverable)	Coeff Variation	s	# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
	Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L			ug/L	CV		n			
Ammonia (summer)	1.00	1.00	2.0000	5100.0	830.0	286.95	48.05	NO	0.95	0.989	7589.0	0.93	0.79	272	0.60	99
Ammonia (winter)	1.00	1.00	2.8000	2100.0	470.0	1192.01	195.00	NO	0.95	0.980	26870.0	0.99	0.82	152	0.71	99
Arsenic	1.00	1.00	1.7400	360.0	190.0	76.98	8.15	NO	0.95	0.652	1.67	0.60	0.55	7	2.01	99
Cadmium	0.94	0.94	0.0600	1.7	0.6	0.23	0.09	NO	0.95	0.368	1.00	0.60	0.55	3	3.00	99
Chromium	0.98	0.96	0.5140	15.0	10.0	2.08	0.76	NO	0.95	0.652	13.00	0.60	0.55	7	2.01	99
Copper	1.00	1.00	1.2940	8.65	6.14	3.51	1.65	NO	0.95	0.688	19.40	0.60	0.55	8	1.90	99
Lead	0.47	0.47	0.0628	29.30	1.14	0.10	0.07	NO	0.95	0.368	0.50	0.60	0.55	3	3.00	99
Mercury	0.85	0.85	0.0040	2.100	0.012	0.00	0.00	NO	0.95	0.473	0.01	0.60	0.55	4	2.59	99
Nickel	1.00	1.00	0.8420	770.74	85.60	1.08	0.88	NO	0.95	0.473	1.82	0.60	0.55	4	2.59	99
Silver	0.85	0.85	0.0778	1.00	1000.00	0.21	0.10	NO	0.95	0.652	1.30	0.60	0.55	7	2.01	99
Zinc	1.00	1.00	2.5530	62.26	56.86	11.27	3.96	NO	0.95	0.762	85.00	0.60	0.55	11	1.68	99

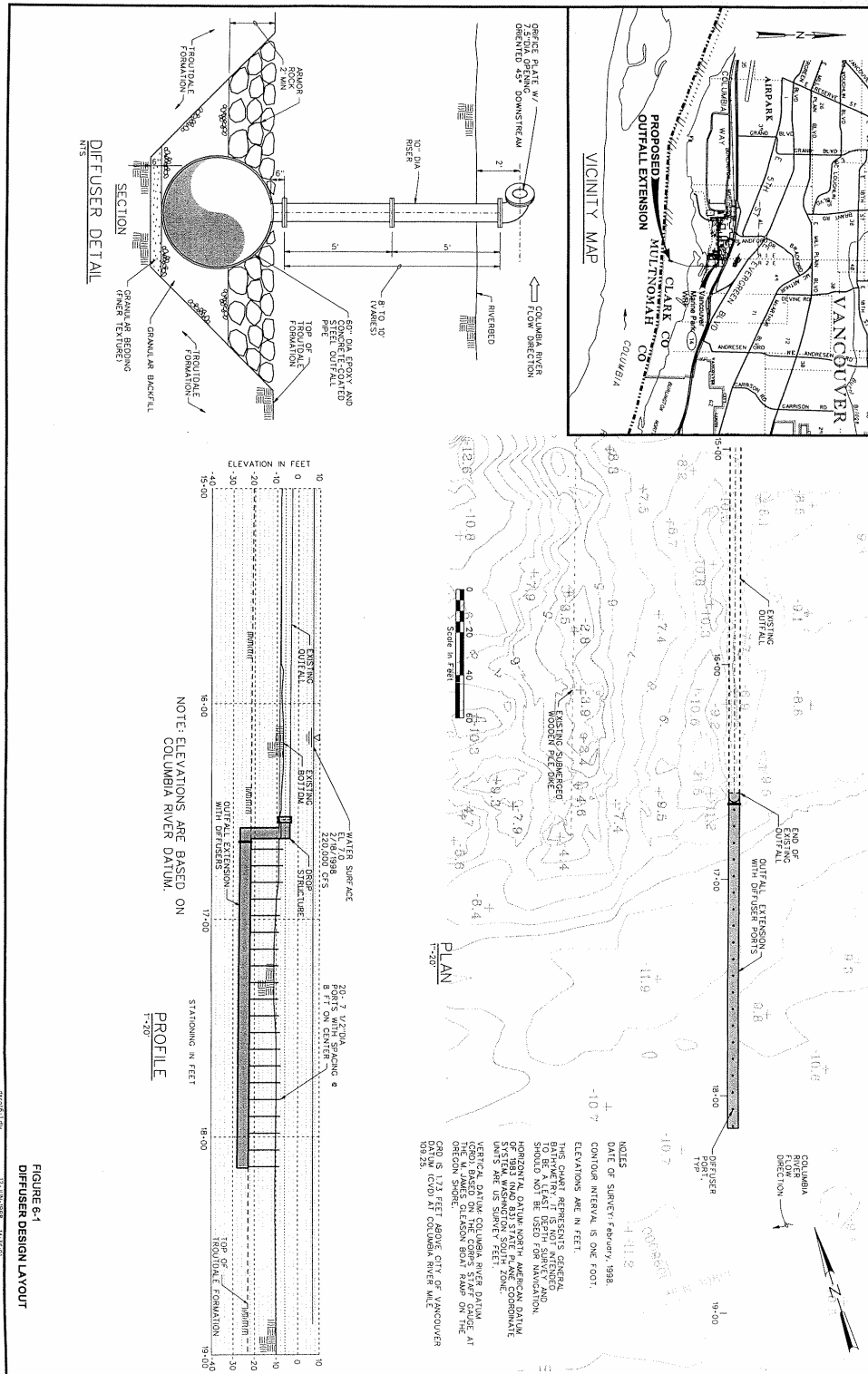
FACT SHEET FOR NPDES PERMIT WA0024368  
CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY



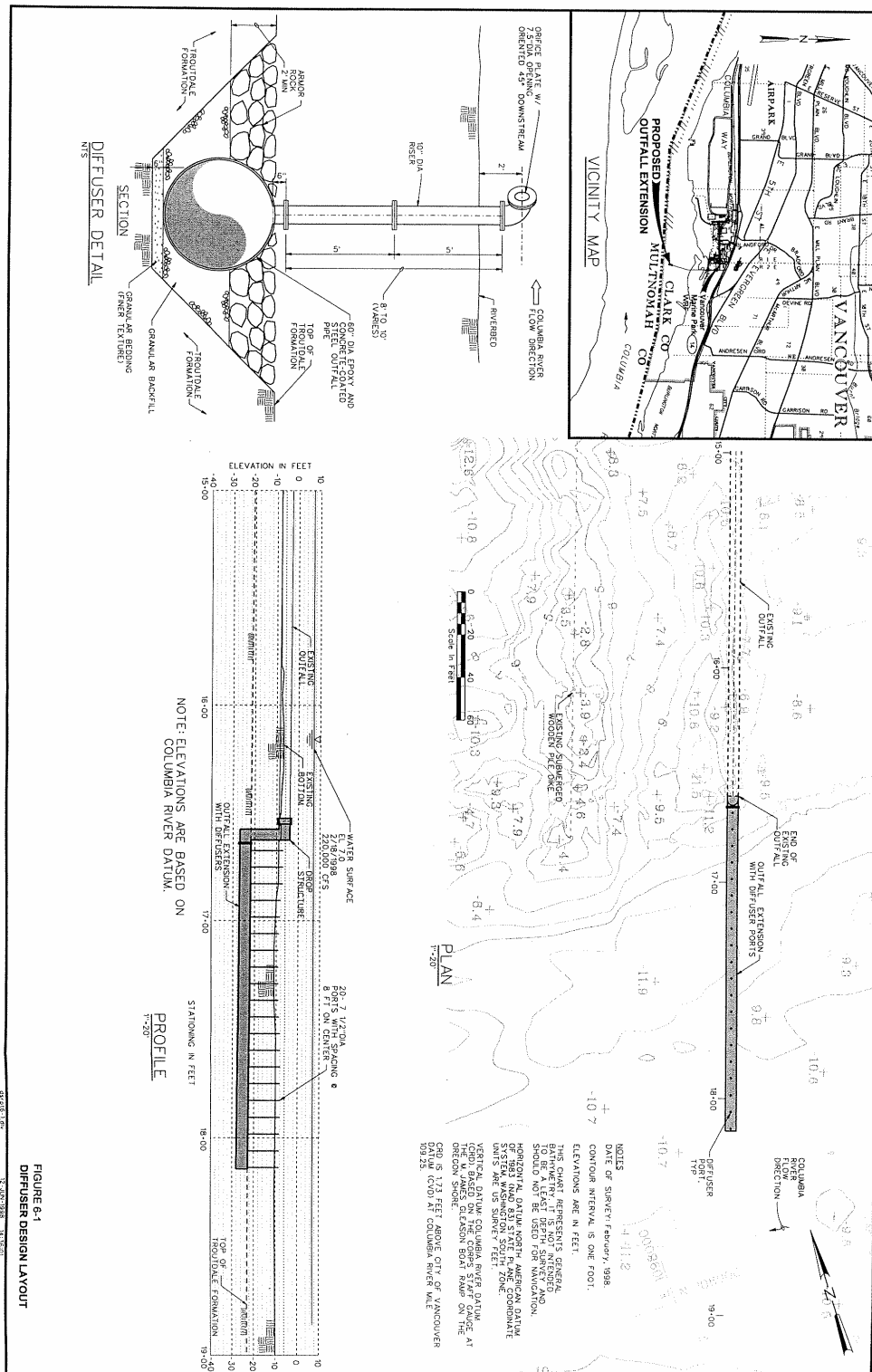
FACT SHEET FOR NPDES PERMIT WA0024368  
CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY



FACT SHEET FOR NPDES PERMIT WA0024368  
CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY



FACT SHEET FOR NPDES PERMIT WA0024368  
CITY OF VANCOUVER, MARINE PARK WASTEWATER TREATMENT FACILITY



APPENDIX D--RESPONSE TO COMMENTS